DOCUMENT RESUME

ED 294 251 CS 506 089

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TITLE Imaging and Creativity: Creating and Reacting to Sense Data.
PUB DATE Nov 87
NOTE 17p.; Paper presented at the Annual Meeting of the Speech Communication Association (73rd, Boston, MA, November 5-8, 1987).
PUB TYPE Speeches/Conference Papers (150) -- Information Analyses (070)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Cognitive Processes; *Creativity; Creativity Research; *Imagery; Language; Speech Communication
IDENTIFIERS *Imaging; *Intrapersonal Communication; Mental Imagery

ABSTRACT

To gain a greater understanding of both imagery and creativity, either separately or as interacting processes, several areas must be addressed from an intrapersonal communication perspective: definitions of creativity, imagery, and imaging; the relationship between creativity and imagery; and language and imagery in creativity. A useful working definition of creativity might be: creativity is the manipulation of actual perceived or synthesized sense data to form new relationships that have meaning to an environment. Mental imagery can provide for the creation of sense data. The similarities between these two terms lead many sources to accept and promote the relationship between creativity and the ability to image. The interaction of verbal communication and imagery is a necessity for higher creative abilities. Mental imagery can be taught and learned, allowing people to expand their creative abilities. (Forty-five references are appended.) (MS)

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IMAGING AND CREATIVITY: CREATING AND REACTING TO SENSE DATA

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Abstract: The process of mental imagery, or reacting to self-created internal representations of various stimuli is discussed. The creative person is operationalized as one who has the cognitive flexibility to manipulate sense data. It is further suggested that the creative person can create, manipulate, and react to mental pictures and other self-generated data. This paper will examine the relationship between mental imagery and creativity from this intrapersonal communication perspective.

Paper presented at the annual convention of the Speech Communication Association, Boston, MA, November 7, 1987.

CS506085

What is creativity? What makes a person creative? What facets of an individuals psychological and cognitive make-up interact to produce creativity? Is mental imagery a necessary ingredient to creativity? This paper will address these and several other questions pertaining to the individual creative mind and imaging as intrapersonal communication.

Both imagery and creativity are complex terms, and in the pursuit to understand them either seperately or as interacting processes, their complexity has been ignored (Forisha, 1978). This paper examines imagery and creativity, specifically addressing: 1) some related definitions of creativity; 2) definitions and a discussion of imagery and imaging; 3) the relationship between creativity and imagery; 4) language and imagery in creativity; 5) two testimonials of modern creative minds; and; 6) directions for future research.

Definitions of Creativity.

Creativity, as with many terms examined in the field of communication and related areas, finds itself in a definitional quagmire. "...Creativity is one of the vaguest, most ambiguous, and most confused terms in psychology and education, [and] that the creative person is [rare]" (Ausubel, 1968 as cited by Durio, 1975, p. 233). This ambiguity leads to creativity being defined in a variety of ways; these definitional differences are highly dependent on the predisposition of the writer/theorist/researcher. Some attempt to define the act of creativity, some the creative process, and others the creative person. This paper does not attempt to construct a comprehensive definition of creativity, nor does it attempt to analyze critically the various definitions used; rather, this paper will examine creativity by constructing a working definition consisting of the ingredient or ingredients common to most discussions of creativity.

Creativity has been viewed as the intrapersonal process of combining stimuli from a culture in a way that it has not been combined before, in essence creating new

relationships between objects, ideas, values, and other cultural artifacts or ideologies. Gowan (1979) states that "creativity...[is]...the production of material or relationships new to a culture" (p. 39). This new relationship does not have to be new to the culture as a collective mind, but rather to the individual experiencing the insight gathered by this new relationship. It is the individual mind that possesses the flexibility to take sense data, manipulate it, reorganize it, and view the world in a new way via this process. Sense data refers to stimuli from the actual physical environment, perceived psychological environment, or produced through mental imagery.

Imagination guided by intent adds further to an investigation of creativity. It has been asserted that creativity employs the imagination, either in a free-flowing spontaneous sense or in the form of intentional imagination, with a goal or purpose (Osborn, 1953). Using the imagination, or other forms of stimuli, requires the creative person to examine sense data, either real and tangible or imaginary, and cognitively process the data to create a meaningful picture of the environment. The motivation to create a meaningful picture of the environment runs under the tenets of cognitive dissonance theory; individuals attempt to reduce dissonance by creating a state of "psychological harmony." By creating missing pieces of data to fit the expectations of a situation, dissonance may be decreased.

Because making sense of an environment which is based on many inputs may not necessarily be blatant and obvious, openmindedness of the individual is necessary. Additional data may have to be assigned or created to add sense to an incomplete environment. Durio (1975) supports other writers who encourage the importance of cognitive flexibility in the creative process; he states that replacing a "rigid set" of interpretive rules with more flexible ones will allow us to view a situation or environment from "many angles" .

Intrapersonal data that is incomplete requires flexibility in cognitive processing. This

leads to the assumption that the creative person must not follow strict rules for interpretation of data; rather, this person must remain open to lack of easily digestible cognitive inputs. "Many researchers have listed characteristics describing the creative person. Roe (1963) specifically emphasized openness to experience, heightened perception, extreme curiosity, tolerance of ambiguity and preference for complexities as some of the more important characteristics" (Ainsworth-Lane, 1982, p. 6). Taking data from an ambiguous situation, reorganizing the data, and creating new meaningful relationships within the data structure requires "heightened perception".

Creativity has also been defined as an individual's level of wonderment and awareness (Fromm, 1959) which requires individual planning and structuring (Guilford, 1950). Of all of the definitions of creativity, Gilchrist (1972) states that there is one necessary ingredient; this is the ability to make tangible or intangible relationships that are new and valuable to a particular environment.

Taking the above definitions, searching for their commonalities, and combining them offer the following working definition of creativity: creativity is the manipulation of actual perceived or synthesized sense data to form new relationships that have meaning to an environment. This creation and manipulation of sense data can be examined through imagery research.

Mental Imagery

Imaging has been defined as "quasi-perceptual experiences of which we are self-consciously aware, and which exist for us in the absence of those stimulus conditions that are known to produce their genuine sensory or perceptual counterparts" (Richardson, 1969, p. 2). Ahsen (1977) defines imaging as a mental process where a subject can scan an event in his/her mind as he/she would scan a real life event. "'Imagery' refers to internal figural representations or codings which are related to sensory experiences. As with 'creativity,' the term 'imagery' refers to both product and

process" (Durio, 1975, p. 234).

Imagery assists us in the creation of our perspectives of our environment, either physical or psychological, either absent or present, as much as our sensory cues do (Short, 1953). Mental imagery can provide for the creation of sense data. When a situation is encountered where the data needed to create a meaningful and consonant view of the environment is not perceived, individuals rely on mental imagery to create the missing data. This creation can take the form of any sensory experience; examples include the passerby who saw smoke billowing from the windows of a house and reported seeing flames, and the young boy who is sure there is something moving in his closet during the thunder storm. Research in perceptual ability suggests that humans have an inert capabiltiy to image missing portions of incomplete environments to the point where the image becomes the reality (Wakefield, 1976); what the person believes they have experienced is actually their self-created image.

Imaging has many applications and has been studied in various fields: psychology (Mowrer, 1977), psychotherapy (Leuner, 1969; Sheikh & Jordan, 1983), treatment of illnesses (Sheikh & Kunzendorf, 1984), athletics (Suinn, 1983), and art (Lindauer, 1983). Imaging has been used in problem solving (Kaufmann & Helstrup, 1985), to overcome phobias and increase existing skills (Meichenbaum, 1977; Singer, 1974), and to reduce communication apprehension (Ayres & Hopf, 1985, in press). "...In the past decade, imaging has been applied to sex therapy, weight loss, enhanced performance in sports, memory improvement, setting goals and solving complex problems. Imaging has been used to break through, to control, to run from, *to manipulate*, to cure, *to create*, to censor, to build ego, to tear it down, to expand consciousness" (Ainsworth-Lane, 1982, p. 9, emphasis added). These emphasized verbs add support to the thesis that mental imagery allows for manipulation and control of sense data.

Research supports the proposition that the act of imaging an object produces

psychological and physiological reactions similar to actually experiencing the object (Sheikh & Jordon, 1983). When an individual images herself running quickly, her heart rate will rise, when an individual images himself in a stressful communication situation, the strategies used in the image to overcome the anxiety can be generalized to an actual situation (Klinger, 1980; Richardson, 1969).

The process of imaging requires the user to concentrate actively and image in the "mind's eye", or any of the other "mind's senses", a specific set of stimulus conditions (Benson, 1975; Betts, 1909). This assertion is what differentiates imaging from perception; perception requires an external cue while imagery can rely solely on internal psychological prompts or stimuli (Bugelski, 1971).

Witmer and Young (1985) state that people create spontaneous images while in deep thought or in daydreams or fantasies; this is where imagery occurs without any conscious effort or evocation. Conversely, conscious intent can be used to produce mental images. Images can be evoked in two basic ways, via directed imagery and guided imagery:

> Directed imagery is an active mode of imaging and means consciously choosing what is to be imagined. For example, it is possible to imagine competing successfully in a sporting event, coping with a stressful situation, getting a desired job done, or improving a relationship.
>
> Guided imagery is a combination of spontaneous and directed imagery. In guided imagery, a semi-structured situation is presented. The presentation is usually given orally by another person who serves as a guide. The ambiguous situation is "filled in" by the participant's spontaneous images. For example, if asked to imagine living on a hill, some people would create a mansion and others a cabin. (Witmer & Young, 1985, p. 188).

"Under what conditions does imagery occur?...The key elements in the situation appear to be: a) lowering the sensory input, and; b) stopping the internal verbal chatter" (Gowan, 1979, p. 42). To increase the effectiveness of imagery the individual must achieve a state of readiness, have a degree of vividness to their image, be able to *control* their image, and must practice the imagery (Witmer & Young, 1985). This requires an individual to become relaxed and concentrate on the imaging session which can be accomplished through directed or self-imposed relaxation; relaxation can help in improving the ability to image (Richardson, 1969). Next, the image must be created and made as vivid as possible within the mind of the individual. This vivid image should be controlled; the individual should be able to direct the image as it is developed. Being able to manipulate this synthesized sense data may allow the individual to form new meaningful relationships based on cognitive flexibility and perspective expansion.

Mental Imagery and Creativity

Mental imagery is the act of forming sensory cues and sense data within the mind of an individual. This data can be manipulated to form new relationships. Creativity has been examined as the act of developing meaningful relationships between data that have not been previously combined. The similarities in these terms lead one to initially assume a relationship between the two concepts. This initial assumption is supported by many sources all of which accept and promote the relationship between creativity and the ability to image.

The importance of studying imagery, creativity, and the interaction between them is stated by Assagioli (1965 as cited by Ainsworth-Lane, 1982): "The imagination, in the precise sense of the function of evoking and creating images, is one of the most important and spontaneous active functions of the human psyche, both in its conscious and unconscious levels" (p. 8). The relationships between these two concepts needs to be examined. (Khatena, 1975; Leonard & Linenauer, 1973; Torrance, 1969).

Relationships between imaging and creativity are drawn and supported by researchers from many disciplines. These relationships include, but are not limitied to the following: the more creative person will possess greater flexibility to intrapersonally represent a situation in more ways and more quickly than a noncreative person (Taylor, 1959); imagery can be used as a technique to encourage creativity via the manipulation of data (Osborn, 1953); a greater variety of sensory experiences connected with a situation creates a conglomeration of data; this data can be experienced through imagery thus allowing a wider perspective and increased flexibility when cognitively contextualizing ideas (Walkup, 1967 as cited in Durio, 1975); more uses for objects are thought of when a subject first images the objects as opposed to not imaging the object at all (Davis & Manske, 1966 as cited by Durio, 1975). "...It appears that the individual ability to image must play a valuable role in creative functioning..." (Durio, 1975, p. 233).

Creativity and imagery are linked through intrapersonal communication. Individuals allow various sensory images to interact with each other to create new relationships. "Much of brain activity relative to the creative imagination has to do with imagery of the re-experiencing of images...creative imagination...[is]...mental processing where *interactive* intellectual and emotional forces participate in stimulating, energizing and propagating the creative act" (Khatena, 1978 as cited by Gowan, 1979, p. 41,emphasis added). This interaction, or intrapersonal communication is discusse by West (1975 as cited by Gowan, 1979) in terms of the left and right side of the brain. "With support from recent research in the neurosciences I speculate that minor scientific creativity is likely to be mainly left hemisphere cognitive excitation, while major scientific creativity is likely to involve the excitaton and *intercommunication* of both cerebral hemispheres" (p. 40, emphasis added).

"Right hemisphere imagery is the vehicle through which incubation produces creativity" (Gowan, 1979, p. 39). Incubation is a term discussed by Wallas (1926)

referring to forms of relaxation used by a person to allow subliminal consciousness to enter into the conscious cognition; this includes techniques such as fantasy, daydreams, meditation, self-hypnosis, visualization, and imagery. Although those who study creativity come from many diferent perspectives; "It would seem from surveying the literature on this subject that imagery can get involved to some degree in creative functioning, irrespective of particular theoretical explanation" (Durio, 1975. p. 235).

Support of the relationship between imagery and creativity can be sought from two more sources: 1) a discussion of the inadequacy of language to combine thoughts and the interaction of imagery with verbalization; and, 2) testimonials and analyses of creative geniuses.

Language and Imaging

Mental imagery allows for visual and other sensory representations of data ranging in clarity, understandability, confusion, and movement. This allows the individual to process and create information without relying on verbal representations or symbols. Imagery puts at our disposal the ability to contemplate information that would otherwise be uninterpretable or unexplainable by simply using the spoken word. Imagery allows for more flexibility in cognitive processing than language because of the freedom from the restrictions placed on creating shared meaning used in language. "An individual's image in response to a given stimulus is unique to him, while the symbolic code for that same stimulus shares semantic commonality with the coding of others " (Durio, 1975, p. 240). Language interpretation is directed by a strict set of rules; when we decrease the rules we must follow when interpreting data, our cognitive flexibility increases. It is suggested that verbal abilities are born out of imaging abilities. Pavio (1971) supports the idea that the development of language use in children is based on the ability to produce mental representations which are then encoded into grammar and syntax.

The verbal code which aids us in our interpersonal communication has limitations

in many areas including creating new relationships between sense data; not only are we restricted by rules and codes of verbal communication, but some ideas defy verbal symbolic representations. "Much of the creative thought of the designers of our technological world is nonverbal, not easily reducible to words. Its language is an object or a picture or a visual image in the mind" (Ferguson, 1977 as cited by Gowan, 1979, p. 44). Ferguson (1977 as cited by Gowan, 1979) goes on to state that, "Many features and qualities of the objects that a technologist thinks about cannot be reduced to unambiguous verbal descriptions; that are dealt with in his mind by a visual, nonverbal process. His mind's eye is a well developed organ that not only reviews the contents of his memory, but also forms such new or modified images as his thoughts require" (p. 44).

Modification or flexibility of mental images in the production of creative thoughts are stressed by scientists who work with highly abstract equations and theoretical concepts; imaging the abstract idea allows for manipulation of data and allows for creative metamorphosis (Posner, 1973 as cited by Durio, 1975). Not only does imaging allow an individual to alter what appears in the mind's senses, it allows for increased clarity and vividness of thoughts and ideas. This increased clarity allows for more accuracy and more flexibility in the recall of ideas. "It also seems logical to assume that adults who can recapture this vividness of perception in the form of visual, auditory, and kinesthetic imagery are capable of more imaginative and novel responses than those who are immersed solely in verbal representations" (Durio, 1975, p. 237). Image clarity, vividness, and flexibility have been measured using a shortened form of Bett's Questionnaire Upon Mental Imagery (Betts, 1909; Sheehan, 1967). Khatena (1975) found that there was a significant relationship between the vividness of mental imagery, as measured by Betts' questionnaire, and subjects responses to a measure of creative self-perception. Rhodes (1981) also found that "vividness of mental imagery correlates

significantly with creative elaboration" (p. 97).

While imagery is asserted as a superior intrapersonal tool for creative idea production, it should not suggest that verbal representations should be ignored. The uses of language may add expanded abilities for idea manipulation, and certainly allows for greater communication ease with others about ideas. The interaction of verbal communication and imagery is stated as being a necessity for higher creative abilities. "...both iconic and symbolic systems are needed to acheive the highest level of creative functioning...Ideally, both imagery and verbal language systems work together to affect the mental operations and problem-solving processes of humans" (Durio, 1975, p. 238).

Various theoretical perspectives point to the notion that creativity and imagery are closely dependent on one another. Quantitative research supports this notion as well. One other source to be discussed which links these two concepts are testimonials and biographical statements of individuals who are labeled as creative by society. Uses of mental representations of data tend to be a commonality in the cognitive processing of information among these people; mental imagery is "the *sin quo non* of creativity for many outstanding people" (Green, Green, & Walters, 1970 as cited by Rhodes, 1981, p. 91). For these minds, imaging is inseparable from creative process. The ability to image is not as much consciously evoked as it is a natural process. "Creative individuals appear to have stumbled onto and then developed to a high degree of perfection an unusual ability to visualize mentally - almost hallucinate - in the areas in which they are creative" (Walkup, 1965 as cited by Rhodes, 1981, p. 93).

Testimonials

Two great thinkers and creative geniuses of our time support the assertions that imagery is a necessity to creativity. Both composer Brahms and scientist Einstein have discussed their experiences of mental imagery. Brahms stated that, "I immediately feel vibrations which thrill my whole being..In this exalted state I see clearly what is obscure

in my ordinary moods...Those vibrations assume the form of distinct mental images" (Abell, 1964 interviewing Brahms as cited in Gowan, 1979, p. 43). Albert Einstein rarely thought in words but relied on "visualizing effects, consequences, and possibilities [pertaining to a situation]" (Holton, 1972 as cited by Gowan, 1979, p. 46). These are just two testimonials of many that support the thesis of this paper. "The literature abounds with reports from artists and scientists on the presence and importance of images in creative breakthroughs. Current psychological studies have shown definite relationships between specific aspects of creativity and imagery. There is enough evidence to encourage a great deal of further research" (Ainsworth-Lane, 1982, p. 5).

Future Research

It is the view of the author that future research in this area should expand its focus past theoretical conceptualizations of the interaction between imagery and creativity to a more pragmatic perspective. Mental imagery has been used in many fields of study for many pragmatic purposes. The ideas stated in this paper lead one to examine the application of imagery training to creativity expansion. Gowan concludes his article by stating that imaging and visualization techniques that are the intuition of geniuses and great thinkers may be learned by others. (Gowan, 1979). Guided imagery (Witmer & Young, 1985) may be an appropriate method to teach imagery to enhance creativity.

Research on imagery instruction has been introduced to communication and related disciplines. Some findings conclude that subjects who were instructed in imaging techniques displayed increased abilities in decreasing the time needed to create mental representation (Haber, 1964) and decreased the amount of time it took for the image to decay (Boles, Eichelman, & Taylor, 1986). Being instructed in, and practicing, mental imagery allows for increased image clarity and the preservation of the image for later recall (Paivio, 1971). These are but a selected sample of conclusions that support that mental imagery can be taught and cultivated.

Creativity involves the manipualtion of sense data to create a meaningful relationship to an individual or culture. It is asserted that the process of mental imagery can be used to manipulate sense data to create new relationships. Creative geniuses seem to have a natural ability to image vividly, but they are not the only ones who benefit from imaging. Imagery can be taught and learned, thereby allowing us all to expand our creative abilities.

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